Preoperative Prediction of The Operability of Pancreatic Carcinoma

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Abstract

This work discussed the best diagnostic modality for early detection of pancreatic cancer compared to final diagnosis reached by histopathological examination. The present study was constructed by doing imaging modalities computed tomography (CT) and endoscopic ultrasonography (EUS) on 24 patients admitted to surgery department in the faculty of medicine with suspected pancreatic malignancy. As regard masses diameters detected by each modality, EUS was found to be superior to CT in detection of masses less than 20mm in diameter. According to the mass nature, those found in the head region tended to be malignant more frequently than the body and tail, Moreover, solid heterogeneous masses also were more likely to be malignant than the cystic ones as detected by the imaging modalities, with higher accuracy of EUS than with CT. EUS showed more accurate information as regards lymph node involvement and vascular invasion than CT. All of which affected the assessment of resectability of pancreatic masses. On head-to-head comparison, EUS appeared to perform better than CT scan in respect to nodal staging. Based on these results, we conclude that EUS staging should be the standard of care along with state of the art CT scan for the preoperative evaluation of patients with pancreatic cancer. However, large, prospective, multicenter studies directly comparing the accuracy of linear EUS vs. new generation CT scanners are still needed.

1. Introduction

Pancreatic cancer is the most lethal of all gastrointestinal malignancies, as it has a very poor prognosis. Unluckily, most patients present late in the course of their disease and, at the time of diagnosis, only 10 to 25% of patients will be suitable for possibly curative resection. Efforts must be focused on an early diagnosis and towards reliably recognizing patients who can really benefit from major surgery [1]. Pancreatic cancer is considered as fourth leading cause of cancers death in most countries. It has a relatively high incidence, it is one of the top ten incidence cancer in Europe and USA, with an overall 5-year survival rate of less than 5% [2].

A suspected pancreatic tumor can be a difficult challenge for the clinician; first, you must find the lesion (detection), secondly you must make a differential diagnosis between benign and malignant pancreatic masses and, once the diagnosis of pancreatic cancer is established, you need the most accurate preoperative staging to select patients who can benefit from curative resections [3].

Endoscopic ultrasonography (EUS) is a combination of endoscopy and intraluminal ultrasonography, using a high frequency transducer at 5–20 MHz. In addition, the short imaging distance to the target lesion through the endoscopic device allows high-resolution ultrasonographic images. EUS is now a widely accepted modality for the diagnosis of gastrointestinal and pancreatobiliary diseases [4]. Moreover, due to the small distance between the probe and the pancreas and the capability of tissue acquisition, EUS is considered the best imaging technique for the study of pancreas, EUS can assess tumor invasion and presence of metastatic lymph nodes with high accuracy [5]. The introduction of EUS guided fine needle aspiration (EUS-FNA) in the early 1990s represented a major breakthrough by offering

the possibility to obtain a tissue diagnosis, especially for confirmation of malignancy in pancreatic mass lesions [6]. EUS-FNA is a safe and highly accurate method for tissue diagnosis of patients with suspected pancreatic carcinoma, EUS-FNA not only very useful in establishing a clear tissue diagnosis of malignancy, but also in accurately staging the disease preoperatively, influencing the decision making process and thereby reducing the morbidity that accompanies inappropriate surgical interventions in advanced pancreatic cancer patients [7].

The aim of this study is to prospectively evaluate the efficacy of Endoscopic Ultrasonography (EUS) and Computed Tomography (CT) in staging and assessment of tumor resectability in pancreatic cancer.

2. Patients And Methods

2.1. Patients: A prospective cohort study includes 24 patients admitted to general surgery department in Zagazig University Hospitals and Mansoura University Hospitals (the study is multicentric) during the period from September 2017 till February 2019.

Inclusion criteria: Sex: male and female. Age: any age. Patients with operable pancreatic mass. Patients suspected to have pancreatic cancer clinically and by imaging such as ultrasound, CT, MRI, and referred for EUS: Operable pancreatic mass lesions seen by CT or MRI and referred for more confirmation by EUS.

Exclusion criteria: Patients who are already diagnosed as non-operable pancreatic tumors (patients with computed tomography showing any vascular invasion or distal metastasis). Patients with history of bypass operation. Patients who are shocked, in peritonitis or in acute abdomen. Patients unfit for anesthesia

All patients were subjected to:

2.2. Full history including: Personal history, Present history, Past history: DM, Operations, Blood transfusion and Drugs, Family history: for Consanguinity and Similar conditions in the family.

2.3. Complete general examination: Complexion of the patient (pallor, jaundice or cyanosis, etc.), Level of consciousness, Vital signs (heart rate, temperature, respiratory rate and blood pressure).

2.4. Local examination. Examination of chest, heart, abdomen and CNS. (Especially Symptoms and signs of biliary obstruction including jaundice, pain, loss of weight and changes of colour of urine and stool)

2.5. Investigations including:

2.5.1. Laboratory investigations: Hemoglobin, white blood cells and platelets. Liver profile: S. bilirubin, AST, ALT, Alkaline phosphatase, total protein and S.albumin. Kidney profile: S. creatinine and Bl. Urea. Coagulation profile: Prothrombin time in seconds and international normalized ratio (INR). Serum Amylase and Lipase. Serum Cancer Antigen19-9 (CA19-9). Fasting blood glucose.

2.5.2. Imaging studies

- **Computed Tomography (CT):**

CT scans are obtained using a high speed advantage scanner using (siemens somatom plus and X-vision Toshiba) Routine technique for CT abdomen and pelvis with oral and IV contrast.

Fasting: The patient was asked to come fasting for at least four hours before.

Unenhanced images are obtained first to locate the upper and lower borders of the pancreas so that the entire gland (pancreas) would be included in the contrast enhanced study.

Oral contrast regimen: Contrast material (Omnipaque 2-3%) administered as follows:

The first cup (2/3) was given 6-8 hours before examination together with an oral tablet of metoclopramide to facilitate filling of the distal small intestine and colon.

The second cup (1/3) was given 30 min before examination which fill the proximal jejunum and ileum.

Intravenous contrast regimen: includes an intravenous injection of (80-100mL) of 60% iodinated contrast medium for the abdomen. It was given by manual intravenous injection immediately before scanning by rate 7ml/sec, pre-contrast non spiral sections to the liver, pancreas were obtained prior to spiral acquisition, starting from the level of diaphragmatic copula to the lower border of the liver, scanning time is one second. Two spiral acquisitions were then performed post contrast injection. The first sequence consisted of thin-section images of the pancreas obtained during the pancreatic phase 40-70 seconds after initiation of the intravenous injection of contrast material. In second sequence, the liver was scanned during the maximal hepatic phase of enhancement 70-100 seconds after contrast material administration.

Image Analysis:

Location of the lesions were done according to anatomical landmarks, the lesions were located in the head of pancreas and/or the uncinate process, body or periampullary region.

Presence of malignancy was diagnosed when at least one of the following was observed:

- a. A solid mass with mural nodules.
- b. Defined papillary protuberances within the dilated main pancreatic duct with intraluminal calcifications.
- c. Peri-pancreatic involvement that is invasion of the vessels, duodenum, or stomach.
- d. Lymph nodes measuring at least 5mm in the peripancreatic or periportal tissues or 10 mm in the retroperitoneal chains.
- e. Common bile duct dilatation and/or liver lesions suggestive of metastases.

Unresectability of the tumor by CT was established by:

- a. Presence of solid mass with a mean diameter of 30 mm (range 20-50 mm).
- b. Presence of liver metastases or other organs metastases.
- c. Suspected distant malignant lymph node.
- d. Unreconstructible involvement or occlusion of the superior mesenteric or portal vein, encasement of the celiac trunk, inferior vena cava, aorta, or more than 180° encasement of the superior mesenteric artery.

- **Endoscopic ultrasound(EUS):**

EUS machine: All EUS and EUS-FNA were performed by a single endoscopist using a Pentax linear array Echoendoscope type EG-3870UTK attached to a high end Hitachi Ultrasound AVIUS machine.

Anesthesia: Topical anesthesia of the posterior pharynx with lidocaine spray 10% and deep sedation with intravenous injection of propofol

Position: Patient was placed in the left lateral position.

EUS Technique:

- The endoscopic part of EUS was performed in a similar way to routine duodenoscopy where the echoendoscope was advanced through the esophagus into the stomach down to the pylorus. Entry into the second part of the duodenum was achieved by advancing the echoendoscope into the post bulbar region followed by withdrawing the scope to straighten it, then its tip was ultimately pushed into duodenal second portion.
- To improve visualization, acoustic coupling of the transducer to the digestive wall was achieved through a balloon attached to the ultrasonic transducer that was filled with 5-12ml of water by special function of the air/water valve (balloon contact method) in conjunction with instillation of 100-200 ml of water through the biopsy channel of the echoendoscope (water instillation method).
- Endosonographic scanning was always started at the 7.5 MHz frequency. This was switched to 12 MHz only when more details of a proximal lesion were needed.
- Imaging of the pancreaticobiliary tract was initiated at a level slightly distal to the papilla of Vater at the descending duodenum. At this level, the aorta and IVC appear in cross sections.
- Slight withdrawal of the scope showed an endosonographic image of the papilla which, when normal, clearly presents as a rounded or oval protruding region through the duodenal wall along with images of the intrapancreatic CBD and the distal main pancreatic duct in the head of pancreas (Stack sign) together with the portal vein. The duodenal wall is delineated as five-layered structure similar to the gastric wall.
- Further gradual withdrawal of the instrument to the post bulbar or bulbar region of the duodenum with minor changes in angulation and mild shaft rotation allowed clear visualization of CBD, the liver hilum and the gall bladder in almost all instances.

- When retracting the echoendoscope more proximally in the duodenal bulb, the head of the pancreas with more sections of the main pancreatic duct together with part of the pancreatic body as well as the portal vein with its confluence and the splenic vein were scanned.
- From the gastric antrum, body and fundus, the pancreatic body and tail with sections of the proximal main pancreatic duct in addition to the splenic vessels and the celiac axis were examined respectively.
- The duration of the examination lasted for 20-40 minutes.

Endosonographic criteria for nodal involvement were: Circularity, Homogeneity, Relative hypo echoic intensity, Proximity to the primary lesion.

The malignant lymph nodes are usually large (longitudinal diameter is more than 2 cm), more rounded (transverse: longitudinal ratio is >1:2) and hypoechoic while the benign reactive LN are usually small (<2cm), oval (transverse: longitudinal ratio is < 1:2) and echogenic.

Endosonographic criteria for vascular involvement were:

- a. Loss of the hyperechoic vessel wall/tumor interface.
- b. Direct visualization of the tumor in the vascular lumen.
- c. Non visualization of a major portal vessel in the presence of collateral vessels.

EUS staging of masses: according to the TNM classification System

T1: tumor restricted to the pancreatic tissue with no invasion of surrounding structures.

T2: tumor invading the CBD, or duodenal wall.

T3: tumor invading the portal vessels splenic vessels or confluence denoted by the presence of endosonographic criteria of the vascular involvement (vide supra).

Patients were initially explored to examine:

- a. The presence of previously undetected metastases in the liver, mesentery, or peritoneum.
- b. The involvement of major extra pancreatic vessels: portal vein, superior mesenteric vein (SMV), superior mesenteric artery and celiac axis, for the presence of tumor invasion of the lumen or involvement of the vessel with tumor so that tumor tissue had to be dissected off the vessels, leaving macroscopic tumor tissue behind.

If any of the above were present, the tumor was deemed unresectable and palliative triple bypass (choledochojejunostomy or cholecystojejunostomy, gastrojejunostomy and jejunio-jejunostomy) can be performed.

Otherwise, a pancreaticoduodenectomy (Whipple) for tumors located in the head of the pancreas, distal part of common bile duct and second part of duodenum or a partial pancreatectomy for tumors located in the body of the pancreas can be performed.

The golden standard test was obtained by the biopsy which was aspirated by EUS-FNA and specimen was sent to histopathological correlation by histopathologist, then patient sent for surgical correlation according to tumor size, site and its resectability.

Statistical analysis: The collected data were computerized and statistically analyzed using SPSS program (Statistical Package for Social Science) version 24.

3. Results And Discussion

Most patients with pancreatic cancer are diagnosed when the tumor is 3cm or more in diameter. Most pancreatic cancers are metastasizing to other organs at the time of diagnosis and the median survival is only 18-28 month. The five years survival is about 10% and it has not changed much over several decades. Curative surgical resection is currently believed to offer the only chance for long-term survival in these patients. The difficulty in early diagnosis of pancreatic cancer remains a major obstacle in improving outcome in these patients. However, recent developments in endoscopic ultrasound (EUS) and cytological EUS-guided fine-needle aspiration (FNA), (FNB) allowed early diagnosis of pancreatic cancer with histological confirmation. EUS- FNA, FNB in conjunction with spiral CT or M.R.I also provide reliable preoperative staging of pancreatic tumors [8].

One of the most important tasks of Endoscopic Ultrasound (EUS) in pancreas remains diagnosis and staging of pancreatic cancer (PC) as it is the leading cause of cancer related deaths among all gastrointestinal (GI) malignancies and the fourth leading cause of cancer-related deaths in the United States, with a very poor prognosis [9].

The principal role of EUS in a suspected pancreatic tumor is detection and staging of the mass. EUS is indicated for staging and to evaluate its endoscopic or surgical respectability. Moreover EUS helps to evaluate the depth of the tumor "T" compromise, the presence of lymph nodes "N" and vascular compromise is also evaluated. The FNA-FNB of the pancreatic mass and regional lymph nodes for cytology is occasionally required to confirm the findings or to plan for a neoadjuvant or palliative therapy [10]

This prospective cohort study included 24 patients (Table 1). Our research revealed that PC is common in patients older than 56 years old and this agrees with Michael et al. [11] who said that the risk of developing pancreatic cancer increases as people age. The present study showed that PC were more in males and this agree with Dabizzi et al., [12] who reported that pancreatic cancer has higher incidence among males. Pancreatic cancer incidence rates were highest among African American men (21.3 per 100,000) and women (17.6 per 100,000) during 2004 and 2008. However, the second highest rates were reported for Caucasian men (16.8 per 100,000) and women (12.8 per 100,000). The differences between

these populations and burden of disease may be related to higher rates of cigarette smoking and diabetes mellitus among African American men than for Caucasian men and higher body mass indices among African American women than for Caucasian women. Also in agreement with Michael et al., [11] who reported that men were 30% more likely to develop pancreatic cancer than women. They referred this finding to increased tobacco use in men.

The present study also demonstrated that pancreatic cancer is more common among people living in rural areas (64.6%) Compared to (35.4%) from urban areas (Table 1), but this disagreed with Chow et al., [13], who stated that despite the fifty million people living in rural America, investigation into the impact of rural residence on the quality of complex pancreatic cancer care is noticeably absent. They hypothesized that patient rurality is associated with poor pancreatic cancer care quality measures.

The present study reported that abdominal pain was the most common presenting symptom found in all 24 cases, followed by jaundice in 17 cases, then significant weight loss in 13 cases (Table 2) and this agreed with Balan et al. [3] who stated that common symptoms leading to suspicious of pancreatic cancer were jaundice, epigastric pain, and weight loss. They stated also that signs and symptoms alone were insufficient to diagnose pancreatic cancer.

Out of 24 patients we had 17 patients (72.9%) presenting with obstructive jaundice (Table 2) and it is easily to know that the majority of patients were complaining of one or more symptoms and this agrees with Panzeri et al. [14] who said that the most frequent isolated symptoms of pancreatic neoplasias were obstructive jaundice and clinical or laboratory cholestasis which was seen in 50% to 80% of cases.

As regard our baseline laboratory values data showed in Table (3). We found mild anemia among the cases with median HB level (10g/dl) and range between (8.5 to 12g/dl) and this agreed with Madeddu et al. [15] who reported that anemia was one of the most common side effects associated with cancer. Anemia may occur either as a direct result of the cancer or more commonly as a side effect of cancer treatment.

Also shown in our laboratory values data, normal levels of serum amylase and lipase except for only 3 cases which demonstrated elevated levels above 100 U/L with no significant data of correlation by statistical analysis. These 3 cases were found to be benign in nature by EUS-FNA Moreover, they all gave history of recurrent attacks of pancreatitis and this agrees with Hayakawa et al. [16] who stated that Frequencies of elevated IRE (70%) and CA 19-9 (68%) were higher significantly ($P < 0.01$) than those of amylase (30%) and CEA (28%) among 40 patients with pancreatic cancer.

On the other hand, serum CA19-9 showed significant elevation among most of the cases with a median (135.5 U/L) and this agreed with Duraker et al. [17] who stated that Pancreatic cancer is associated with a dismal prognosis and biomarkers that can detect pancreatic cancer in its earliest stages which should improve prognosis. Despite a large number of putative biomarkers for pancreatic cancer, carbohydrate antigen (CA 19-9) is still the most extensively studied and currently the gold-standard biomarker for pancreatic cancer diagnosis in symptomatic patients.

FBS showed significant elevation among the studied group with a median (197mg/dl) and this agreed with Wang et al. [18] who stated that About 80% of pancreatic cancer patients had glucose intolerance or frank diabetes. This observation has led to the following two hypotheses: i.pancreatic cancer causes the associated diabetes and/or ii.the conditions associated with diabetes promote the development of pancreatic cancer (Cause and/or Effect relationship).

Our research revealed that most histopathological findings of PC were ductal adenocarcinoma detected by EUS and FNA. Out of 24 patients we had 17 (70.83%) patients proved to have ductal adenocarcinoma, 1 (4.17%) patient proved to have mucinous cystadenocarcinoma, 4 (16.67%) patients proved to have pancreatitis, 1 (4.17%) patient proved to have mucinous cystadenoma and the last patient 1 (4.17%) presented with Serous Cystadenoma (Table 4), this agree with Brosens et al. [19] who said that out of all the GI malignancies, pancreatic adenocarcinoma, is the second most common cause of death from cancer. Moreover, in clinical practice pancreatic cancer is mostly ductal adenocarcinoma, which constitutes up to 90% of all primary malignant tumors arising from the pancreas.

In our work the detection rate for pancreatic tumors by EUS was 100%, with good detection for tumors less than 2 cm in diameter. Also in our work regarding studied patient out of 24 patients, 7 patients with tumor size equal 2cm or less. On the other hand out of 24 patients: CT detected 2 cases. this agrees with Callery et al. [20] who reported that the detection rate for pancreatic tumors by EUS is 90-100%, with good detection for tumors less than 2 cm in diameter. Also compatible with Gluck et al. [21] results, the advantage of EUS over classical CT was especially evident for lesions less than 3 cm in size: sensitivity of EUS 99%, CT 55%. This advantage of EUS continued when compared to helical CT for lesions up to 1.5 cm: EUS 100 %, CT 67%. As regard CT: out of the 20 cases detected there were (14) in the head region 12 of them were malignant by histo-pathological examination obtained by EUS-F.N.A/F.N.B. As regard EUS: out of the 24 cases detected there were (17) cases in the head region 14 of them were malignant by histo-pathological examination obtained by EUS-F.N.A/F.N.B. Totally as reported by the imaging modalities; pancreatic cancer is more common in the head than the body and the tail (Table 5). Out of 24 patients with PC, 17 patients had cancer at the head, 7 patients at the body and this agree with Conroy et al. [22] who reported that 60% of PC develop in the pancreatic head and 40% develop in the body and tail as regard his study which was diagnosed by CT and by biopsy.

This work discussed comparison between EUS and CT in detection of vascular invasion: 3, 0 cases respectively, showing that EUS was superior to CT measured by kappa aggrement (Table 6) and this agrees with Dewitt et al. [23] who stated that EUS is a new technique with great accuracy showing superiority over other imaging modalities with specificity, 86% vs 78%; positive predictive value, 67% vs 50%; and accuracy, 88% vs 81%) taking in consideration that EUS is almost always operator dependent.

Also in this work there is a comparison between EUS and CT in detection of lymph node involvement: 9, 6 cases respectively showing that EUS is superior over CT measured by kappa agreement (Table 7), and this results disagreed with Saif et al. [24] who stated that CT with contrast more accurate than EUS in

detection of lymph node involvement. Also we have to take in consideration the operator experience and the new era in technology field of devices which made life much easier.

Finally as regard accuracy of each modality to detect malignancy compared to the final diagnosis as a gold standard by F.N.A our work was summarized before in table (8): that gave us results about superiority of EUS over CT as regard sensitivity, specificity and accuracy.

This data is comparable with Dewitt et al. [23] who analyzed eleven well-designed studies (meta-analysis) comparing EUS and CT for preoperative staging of pancreatic cancer. Regarding the T stage accuracy, 4 of 5 studies concluded that EUS was superior to CT (63-85%) vs. (25-73%).

In conclusion, cross-sectional imaging techniques and EUS are not mutually exclusive and should be considered complementary in staging pancreatic cancer [25].

Conclusion

This study clearly showed that EUS is an accurate pre-operative tool in the assessment of nodal staging, vascular invasion and resectability in patients with pancreatic adenocarcinoma. On head-to-head comparison, EUS appeared to perform better than CT scan in respect to nodal staging. Based on these results, we conclude that EUS staging should be the standard of care along with state-of-the-art CT scan for the preoperative evaluation of patients with pancreatic cancer. However, large, prospective, multicenter studies directly comparing the accuracy of linear EUS vs. new generation CT scanners are still needed.

Declarations

Ethics declarations

Conflicts of Interest

The authors declare that they have no conflict of interest.

Ethics Approval

This study was conducted in compliance with the guidelines of the Helsinki declaration on biomedical research in human subjects. Confidentiality of the identity of the patients and personal health information was maintained.

Consent to Participate

Written informed consent was obtained from the patient.

Consent for Publication

Written informed consent for publication of their clinical details and images was obtained from the patient.

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Tables

Table (1): Demographic data of the studied population (N= 24):

<i>Demographic data</i>		<i>No. (%)</i>
<i>Age, years</i>		56.9 ± 10.3 59 (37-77)
<i>Sex</i>	<i>Female</i>	9 (37.5%)
	<i>Male</i>	15 (62.5%)
<i>Residence</i>	<i>Rural</i>	15 (62.5%)
	<i>Urban</i>	9 (37.5%)

Table (2) Frequency of clinical presentations of the studied population:

<i>Symptoms</i>	<i>No. (%)</i>
<i>Abdominal pain</i>	24 (26.67%)
<i>Jaundice</i>	17 (18.89%)
<i>Dark Urine</i>	14 (15.56%)
<i>Clay Stool</i>	10 (11.11%)
<i>Pruritis</i>	10 (11.11%)
<i>Abdominal Mass</i>	2 (2.22%)
<i>Weight Loss</i>	13 (14.44%)

Table (3): Baseline Laboratory values data of the studied population:

Lab.	Value	Normal values
	Median (Range)	
CBC		
HB	10 (8.5-12)	(11.5-15.5 g/dl)
WBCs	6.9 (4.5-8)	(4-11 10 ⁹ L)
PLT	157.5 (110-450)	(150-450 10 ⁹ L)
LFTs		
T.Bil.	4.5 (0.7-14)	(Up to- 1.2 mg/dl)
D.Bil	2.1 (0.2-9)	(Up to- 0.2 mg/dl)
T.Protien	8 (6.9-8)	(6.4- 8.3 g/dl)
S.Albumin	4 (2.9-4)	(3.5- 5.2 g/dl)
AST	41.5 (13-70)	(Up to- 41 U/L)
ALT	46.5 (22-99)	(Up to- 40 U/L)
ALP	197 (25-510)	(35- 104 U/L)
KFTS		
S.Creatinine	1.2 (0.7-1.8)	(0.7- 1.2 mg/dl)
BUN	25 (23-78)	(6- 20 mg/dl)
Coagulations profile		
PT	11 (10-13)	(11- 14 Sec)
INR	1.2 (0.8-1.4)	(0.8- 1.2)
Pancreatic Enzymes		
Amylase	43 (12-130)	(23- 85 U/L)
Lipase	44 (9-125)	(0-160 U/L)
Tumor Markers & FBS		
S.CA19-9	135.5 (19-630)	(Less than 37 IU/L)
FBS	197 (90-320)	(80- 120 mg/dl)

Table (4): Frequency of Histo-pathological data of the examined biopsies:

<i>Pathology Report</i>	<i>No. (%)</i>
<i>Ductal Adenocarcinoma</i>	17 (70.83%)
<i>Mucinous Cystadenoma</i>	1 (4.17%)
<i>Pancreatitis</i>	4 (16.67%)
<i>Mucinous Cystadenocarcinoma</i>	1 (4.17%)
<i>Serous Cystadenoma</i>	1 (4.17%)
<i>Total</i>	24 (100%)

Table (5): Comparison of mass ch.ch detected by CT & EUS in relation to Final Diagnosis

<i>finding</i>		<i>CT</i>		<i>EUS</i>	
		Benign	Malignant	Benign	Malignant
		N=6	N=18	N=6	N=18
Site	Body (3,4)	2	4	3	4
		66.67%	100%	100%	100%
	Head (3,14)	2	12	3	14
		66.67%	85.71%	100%	100%
	Negative	2	2		
Nature	Cystic (2,1)	2	1	2	1
		100%	100%	100%	100%
	Solid (4,17)	2	15	4	17
		50%	88.24%	100%	100%
	Negative	2	2		
Size	Negative	2	2	0	0
		33.33%	11.11%	0%	0%
	1-10 mm	0	0	1	2
		0%	0%	16.67%	11.11%
	11-20 mm	1	1	1	3
		16.67%	5.56%	16.67%	16.67%
	21-30 mm	2	9	2	7
		33.33%	50%	33.33%	38.89%
	31-40 mm	0	2	1	3
		0%	11.11%	16.67%	16.67%
	41-50 mm	0	4	0	3
		0%	22.22%	0%	16.67%
	> 50 mm	1	0	1	0
		16.67%	0%	16.67%	0%

Density	Hyperdense	1	0	2	0
		16.67%	0%	33.33%	0%
	Hypodense	1	4	1	4
		16.67%	22.22%	16.67%	22.22%
	Isodense	0	2	1	2
		0%	11.11%	16.67%	11.11%
	heterogeneous	2	10	2	12
		33.33%	55.56%	33.33%	66.67%
	Negative	2	2	0	0
		33.33%	11.11%	0%	0%

Table (6) Comparison between EUS and CT in detection of vascular invasion (18 malignant cases, 4 cases of vascular invasion in final diagnosis):

		VI. EUS		Total	χ^2	P
		No	Yes			
VI. CT	No	15	3	18	Fisher	1
	Yes	0	0	0		
Total		15	3	18		
Measure of Agreement		Kappa	Value		P	
			0.833		0.00511	

Table (7) Comparison between EUS and CT in detection of Lymph node involvement (24 cases, 10 cases with Lymphadenopathy in Final diagnosis):

		<i>LN. EUS</i>		<i>Total</i>	χ^2	<i>P</i>
		No	Yes			
<i>LN CT</i>	No	15	3	18	Fisher	0.001
	Yes	0	6	6		
<i>Total</i>		15	9	24		
<i>Measure of Agreement</i>		Kappa	<i>Value</i>		<i>P</i>	
			0.7143		0.0000	

Table (8): Accuracy both modalities (CT and EUS) to detect Malignant Mass:

	<i>CT</i>		<i>EUS</i>	
<i>Validity</i>	Value	95% CI	Value	95% CI
<i>Sensitivity</i>	88.89%	(65.29- 98.62) %	100%	(81.47 - 100.00) %
<i>Specificity</i>	66.67%	(22.28- 95.67) %	33.33%	(4.33- 77.72) %
<i>Accuracy</i>	83.33%	(62.62- 95.26) %	83.33%	(62.62 - 95.26) %
<i>Positive predictive value</i>	88.89%	(71.83 - 96.17) %	81.82%	(71.88 - 88.79) %
<i>Negative predictive value</i>	66.67%	(32.5 - 89.25) %	100%	—